Data Evaluation Report on the Acute Dietary Toxicity of AMPA to Avian Species, *Anas platyrhynchos*

PMRA Submission Number {.....} EPA MRID Number 43334711

Data Requirement:	PMRA Data Code	{.....}
	EPA DP Barcode	Not Provided
	OECD Data Point	{.....}
	EPA MRID	43334711
	EPA Guideline	OPPTS 850.2200 (71-2a)

Test material: Aminomethyl Phosphonic Acid (Glyphosate Degradate) **Purity:** 87.8%
Common name: AMPA
Chemical name: IUPAC: Not Reported
CAS name: Not Reported
CAS No. Not Reported
Synonyms: None Reported

Primary Reviewer: John Marton **Signature:**
Staff Scientist, Cambridge Environmental Inc. **Date:** 1/12/07

Secondary Reviewer: Teri S. Myers **Signature:**
Senior Scientist, Cambridge Environmental Inc. **Date:** 2/13/07

Primary Reviewer: Stephen Carey **Date:** 7/18/07
EPA Biologist, OPP, EFED, ERBIII

Secondary Reviewer(s): {.....} **Date:** {.....}
{EPA/OECD/PMRA}

Reference/Submission No.: {.....}

Company Code	{.....}	[For PMRA]
Active Code	{.....}	[For PMRA]
Use Site Category:	{.....}	[For PMRA]
EPA PC Code	417300 (Parent Compound) & 207800 (Degradate Compound)	

Date Evaluation Completed: July 18 2007

CITATION: Long, R.D., G.J. Smith, J.B. Beavers and S.P. Lynn. 1994. AMPA: A Dietary LC_{50} Study with the Mallard. Unpublished study performed by Wildlife International Ltd., Easton, MD. Laboratory report number 139-276. Study sponsored by Monsanto Agricultural Company, St. Louis, Missouri. Study completed October 28, 1991.

DISCLAIMER: This document provides guidance for EPA and PMRA reviewers on how to complete a data evaluation record after reviewing a scientific study concerning the acute dietary toxicity of a pesticide to avian species. It is not intended to prescribe conditions to any external party for conducting this study nor to establish absolute criteria regarding the assessment of whether the study is scientifically sound and whether the study satisfies any applicable data requirements. Reviewers are expected to review and to determine for each study, on a case-by-case basis, whether it is scientifically sound and provides sufficient information to satisfy applicable data requirements. Studies that fail to meet any of the conditions may be accepted, if appropriate; similarly, studies that meet all of the conditions may be rejected, if appropriate. In sum, the reviewer is to take into account the totality of factors related to the test methodology and results in determining the acceptability of the study.

EXECUTIVE SUMMARY:

The subacute dietary toxicity of AMPA (Glyphosate Degradate) to 10-d-old Mallard ducks (*Anas platyrhynchos*) was assessed over 8 days. AMPA was administered to the birds in the diet at 0 (vehicle control), 493, 878, 1563, 2774 and 4934 mg ai/kg dw of diet; verification of these dose levels was provided in MRID 43334712 and showed that all values were within 93-109% of target (see Reviewer's Comments section for details). The 8-day acute dietary LC_{50} was >4934 mg ai/kg diet. The 8-day NOAEC of AMPA based on the lack of treatment-related mortality and sub-lethal effects was 4934 mg ai/kg diet. According to the US EPA classification, AMPA (Glyphosate Degradate) would be classified as practically non-toxic to Mallard duck on a subacute dietary basis at a nominal concentration of 4934 mg ai/kg diet.

No mortalities were observed during the exposure or recovery periods in the control or any of the treatment levels. Although weight gain and food consumption were reduced at the 2774 mg ai/kg diet treatment level, these effects were not attributed to the test material, as no effects were observed in the highest treatment group.

This toxicity study is classified as scientifically sound, is thus acceptable, and does satisfy the guideline requirement for subacute dietary toxicity study for Mallard ducks.

Results Synopsis

Test Organism Size/Age (Mean Weight): 10 Days; 148 (128-162) g

LC_{50}: >4934 mg ai/kg diet	95% C.I.: N/A
Probit slope: N/A	95% C.I.: N/A
NOAEC: 4934 mg ai/kg diet	
Endpoint(s) affected: None	

I. MATERIALS AND METHODS:

GUIDELINE FOLLOWED: This study was conducted following guidelines outlined in Section 71-2 of the Environmental Protection Agency Registration Guidelines, *Pesticide Assessment Guidelines, FIFRA Subdivision E, Hazard Evaluation, Wildlife and Aquatic Organisms*; and upon ASTM Standard E857-87, "Standard Practice for Conducting Subacute Dietary Toxicity Tests with Avian Species." The following deviation from OPPTS 850.2200 was noted:

The physiochemical properties of the test material were not reported.

This deviation did not impact the acceptability of the study.

COMPLIANCE: Signed and dated No Data Confidentiality, GLP and Quality Assurance statements were provided. This study was conducted in compliance with GLP standards as published by the U.S. EPA in 40 CFR, Part 160; OECD, ISBN 92-84-12367-9; and Japan MAFF, 59 NohSan, Notification No. 3850, Agricultural Production Bureau.

A. MATERIALS:

1. Test Material Aminomethyl Phosphonic Acid (Glyphosate Degradate)

Description: White Powder

Lot No./Batch No. : PIT-9008-2407T

Purity: 87.8%

Stability of Compound Under Test Conditions: Samples of the test diets were taken to verify the test concentrations administered and to confirm the stability and homogeneity of the test substance in the diets. Samples were frozen and transferred to Monsanto Environmental Health Laboratories for analysis. The results of this analysis are provided in a separate report, MRID 43334712. They revealed that the test material levels taken on days 0 and 5 ranged from 88-105% of target.

Storage Conditions of Test Chemicals: Stored at room temperature.

Physicochemical properties of AMPA.

Parameter	Values	Comments
Water solubility at 20EC	Not Reported	
Vapor pressure	Not Reported	
UV absorption	Not Reported	
pKa	Not Reported	
Kow	Not Reported	

(OECD recommends water solubility, stability in water and light, pKa, Pow, and vapor pressure of test compound)

2. Test organism:

Species (common and scientific names): Mallard duck (*Anas platyrhynchos*)
(EPA recommends using either bobwhite quail or mallard duck.)

Age at study initiation: 10 Days
(EPA recommends: 10-14 days old)

Weight at study initiation (mean and range): 148 (128-162) g

Source: Whistling Wings, Hanover, Illinois

B. STUDY DESIGN:

1. Experimental Conditions

a. Range-finding Study: No range-finding studies were reported.

b. Definitive Study:

Table 1: Experimental Parameters

Parameter	Details	Remarks *Criteria*
Acclimation Period: Conditions: (same as test or not) Feeding: Health: (any mortality observed)	 8 Days Same as test Game bird ration formulated to Wildlife International Ltd.'s specifications Not reported; however, birds exhibiting abnormal behavior or physical injury were not used in the definitive test.	Food and water from the town of Easton public water supply were provided *ad libitum*.

Parameter	Details	Remarks *Criteria*
Pen size and construction materials	Brooding pens had floors that measured approximately 62 x 92 cm and ceiling height was approximately 25.5 cm. External walls, ceilings and floors were constructed of vinyl coated wire mesh.	*Recommended pen size is about 35 x 100 x 24 cm*
Test duration	5 days with treated feed and 3 days with untreated feed	*Recommended test duration is 5 days with treated feed and at least 3 days observation with "clean" feed.*
Test concentrations nominal: measured:	0 (vehicle control), 493, 878, 1563, 2774 and 4934 mg ai/kg dw of diet Measured samples of dose levels showed them to be 93-109% of target.	The reviewer corrected the nominal concentrations for the purity of the test material (87.8%). The results from the analysis of the test material in the feed were provided in MRID 43334712. *Five or six test concentrations should be used in a geometric scale, unless the LC_{50} > 5000 mg ai/kg diet.*
Solvent/vehicle, if used type: amount:	Corn Oil 2%	*Recommended solvents include distilled water, corn oil, propylene glycol, 1% carboxymethylcellulose, or gum arabic. The solvent should not be more than 2%.*
Diet preparation and feeding	Test diets were prepared by mixing the test substance into the diet with corn oil. Mixing was done with a Hobart mixer. Diets were prepared on the day of test initiation and sufficient feed was prepared for the duration of the treated feed period.	The control was treated with 2% corn oil only. *The control group should be tested with a diet containing the maximum amount of vehicle used in treated diets.*
Feed withholding period	None reported	
Stability and homogeneity of test material in the diet determined (Yes/No)	Samples were shipped to Monsanto Environmental Health Laboratories for analysis; the results of these analyses are described in another study report, MRID 43334712 (see Reviewer's Comments section for details).	

Parameter	Details	Remarks *Criteria*
Number of birds per replicate/groups for negative control: for vehicle control: for treated:	N/A 10 10	*The recommended number of birds per replicate is a minimum of ten.*
Number of replicates/group (if used) for negative control: for vehicle control: for treated:	N/A 3 1	
Test conditions temperature: relative humidity(%): photoperiod:	Brooding Compartment 33±1°C Room 24±2°C 73±13% 16L:8D; 130 lux	***Recommended brooder temperature is*** *about 35°C (95°F)* ***Recommended room temperature is*** *22-27°C (71-81°F)* ***Recommended relative humidity is*** *30-80%* ***Recommended photoperiod*** *is a minimum of 14 hours of light.*
Reference chemical, if used	N/A; a reference chemical was not used	

2. Observations:

Table 2: Observations

Parameters	Details	Remarks
Parameters measured (mortality/body weight/ mean feed consumption/ others)	-Mortality -Average Weight Gain -Feed Consumption	Feed consumption was reported as an estimate due to the unavoidable wastage of the by the birds.
Indicate the stability and homogeneity of test chemical in the diet	Not reported	
Indicate if the test material was regurgitated	No regurgitation was reported	
Treatments on which necropsies were performed	No necropsies were performed	

Parameters	Details	Remarks
Observation intervals	Daily	
Were raw data included?	Sufficient summarized data tables were provided.	

II. RESULTS AND DISCUSSION:

A. MORTALITY:

Throughout the duration of the test, no mortalities occurred in the control or in any of the treatment levels. Therefore, the resulting NOAEC and LC_{50} values were 4934 and >4934 mg ai/kg diet, respectively.

Table 3: Effect of AMPA on Mortality of *Anas platyrhynchos*

Treatment (mg ai/kg diet)		No. of Birds	Cumulative Mortality				
			Day 1	Day 2	Day 3	Day 5	Day 8
Vehicle Control		30	0	0	0	0	0
493		10	0	0	0	0	0
878		10	0	0	0	0	0
1563		10	0	0	0	0	0
2774		10	0	0	0	0	0
4934		10	0	0	0	0	0
NOAEC		4934 mg ai/kg diet					
LC_{50}		>4934 mg ai/kg diet					
Reference chemical	mortality	N/A	N/A	N/A	N/A	N/A	N/A
	LC_{50}	N/A					
	NOAEC	N/A					

N/A- Not Applicable

B. SUB-LETHAL TOXICITY ENDPOINTS:

Differences in body weight gain and food consumption were observed at the 2774 mg ai/kg diet treatment level from Days 0-5 relative to the negative control; however, as no sublethal effects were observed at the 4934 mg ai/kg diet treatment level, these sublethal effects were not considered to be treatment-related. Furthermore, no behavioral abnormalities were noted. The resulting NOAEC and EC_{50} values were 4934 and >4934 mg ai/kg diet, respectively.

Table 4: Sub-lethal Effect of AMPA on *Anas platyrhynchos*

Treatment (mg ai/kg diet)		Observation				
		Body Weight (g)			Food Consumption (g/bird/day)	
		Day 0	Day 5	Day 8	Days 0-5	Days 6-8
Vehicle Control		142	278	368	64	79
493		146	290	386	65	88
878		150	306	405	77	91
1563		162	293	377	66	90
2774		156	208	342	41	116
4934		148	285	385	68	91
NOAEC		4934 mg ai/kg diet				
EC_{50}		>4934 mg ai/kg diet				
Reference chemical	effect	N/A	N/A	N/A	N/A	N/A	N/A
	NOAEL	N/A				
	LC_{50}	N/A				

N/A- Not Applicable

C. REPORTED STATISTICS:

All toxicity values were determined by visual inspection of the data.

D. VERIFICATION OF STATISTICAL RESULTS:

Statistical Method(s): The complete lack of mortality precluded the statistical analysis of the data. As values for weight gain and food consumption at all treatment levels were similar to the control values, with the exception of the 2774 mg ai/kg diet treatment level, the reviewer visually determined the toxicity values. All values were determined based on the nominal concentrations which the reviewer corrected for the purity of the test material (87.8%).

LC_{50}: >5620 mg ai/kg diet 95% C.I.: N/A
NOAEC: 5620 mg ai/kg diet
Probit Slope: N/A 95% C.I.: N/A

Adjusted for active ingredient: (Optional if over 80% ai)

LC_{50}: >4934 mg ai/kg diet 95% C.I.: N/A
NOAEC: 4934 mg ai/kg diet
Probit Slope: N/A 95% C.I.: N/A

E. STUDY DEFICIENCIES:

There were no study deficiencies.

F. REVIEWER'S COMMENTS:

The reviewer's results were identical to those of the study author.

Samples of the test diets were taken to verify the test concentrations administered and to confirm the stability and homogeneity of the test substance in the diets. Samples were frozen upon transfer to and for storage at Monsanto Environmental Health Laboratories. Results of these analyses are described in a separate report:

> MRID 43334712. Schermes, S. and K.W. McCune. (1994). Results of the Analyses of Avian Diet Samples for AMPA (aminomethyl phosphonic acid). Guideline 71-2. Submitted by The Agricultural Group of Monsanto Company, St. Louis, MO.
>
> Data from this report showed that mixing was uniform (coefficient of variations <3%), as determined by high and low level mixtures of avian diet and test material. Stability of AMPA in avian diet over 5 days at room temperature was also shown (day 0 and 5 samples ranged from 88-105% of target). Adequate diet homogeneity was observed and concentrations of AMPA in avian diet were shown to accurately reflect target levels (93-109%). The analytical report additionally noted a positive diet interference problem (resulting in higher recoveries), where co-extracted amino acids from the diet matrix were possibly reacting with the derivitization agent used in the LC-UV process. To minimize this interference, some sample recovery values were corrected using the concurrently analyzed mean QC sample recoveries.

Although weight gain and food consumption were reduced at the 2774 mg ai/kg diet treatment level, the reviewer agreed with the study authors' statement that the effects were not treatment-related because no effects were observed at the highest treatment level.

The in-life portion of the definitive toxicity test was conducted from September 6 to September 14, 1990.

G. CONCLUSIONS:

This study is scientifically sound and satisfies the guideline requirement for a subacute dietary toxicity test with the mallard duck. The NOAEC and LC_{50} values were 4934 and >4934 mg ai/kg diet, respectively.

LC_{50}: >4934 mg ai/kg diet 95% C.I.: N/A
NOAEC: 4934 mg ai/kg diet
Endpoint(s) affected: None

III. REFERENCES:

Environmental Protection Agency. 1982. Pesticide Assessment Guidelines, FIFRA Subdivision E, Hazard Evaluation: Wildlife and Aquatic Organisms, Subsection 71-2. Office of Pesticide Programs. Washington, DC. 86 pp.

ASTM Standard E857-81. 1982 "Standard Practice for Conducting Subacute Dietary Toxicity Tests with Avian Species". American Society for Testing and Materials.

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Finney, D.J. 1971. Statistical Methods in Biological Assay, 2nd edition, Griffin Press, London.

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